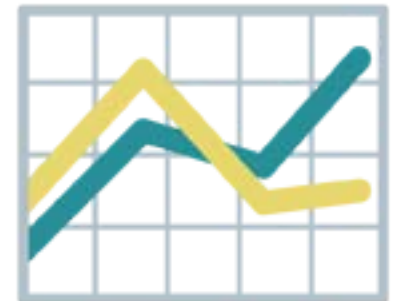


Sacramento River Basin-Wide Feasibility Study

Technical Workshop #2: Preliminary Analysis

Preliminary Analysis of Individual System
Elements from the Sacramento River
Basin-Wide Feasibility Studies

October 23-24, 2013



PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY

Introduction

- System Element Refinement Methodology
- Work Completed to Date
 - Technical Tools
 - Initial Results
- Next Steps

Refinement of SSIA System Elements

Milestone 1

Basin Problems,
Objectives & System
Improvements

Completed

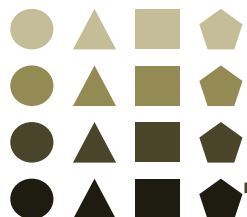
Milestone 2

Refined System
Configurations

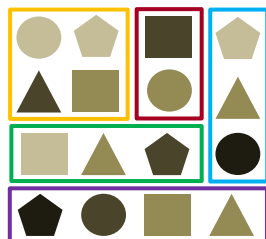
Early 2014

Formulate Refined Physical System Configurations

Evaluate system
improvement features
individually

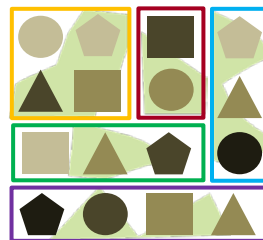


System-scale
physical flood
management
features



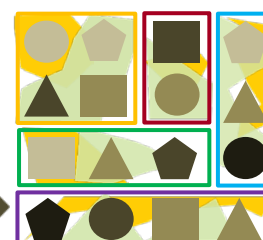
Conduct sensitivity
analysis

Integrate
ecosystem
restoration
features



Collaboration with
Conservation Strategy

Update
assumptions
for regional
features



Based on preliminary
input from RFMP's

Evaluate
tradeoffs

Identify Refined
System
Configurations

Refinement of SSIA System Elements

BWFS Milestones

M1

M2

M3

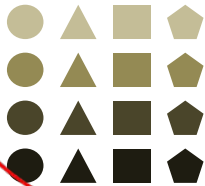
M4, 5, 6

Phase 1

Phase 2

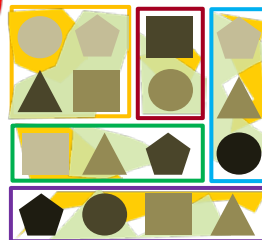
Step 1

Evaluate system improvement features individually



Step 2

Conduct Sensitivity Analysis, Integrate Ecosystem and Regional Features



Step 3

Evaluate trade-offs

Refined System Configurations

Step 4

Confirm recommended basin-wide plan

State Preferred System Configuration

Identify Range of Scales/
Configurations of
System Features

Evaluate Hydraulic
Performance &
Contribution to Flood
Management
Objectives

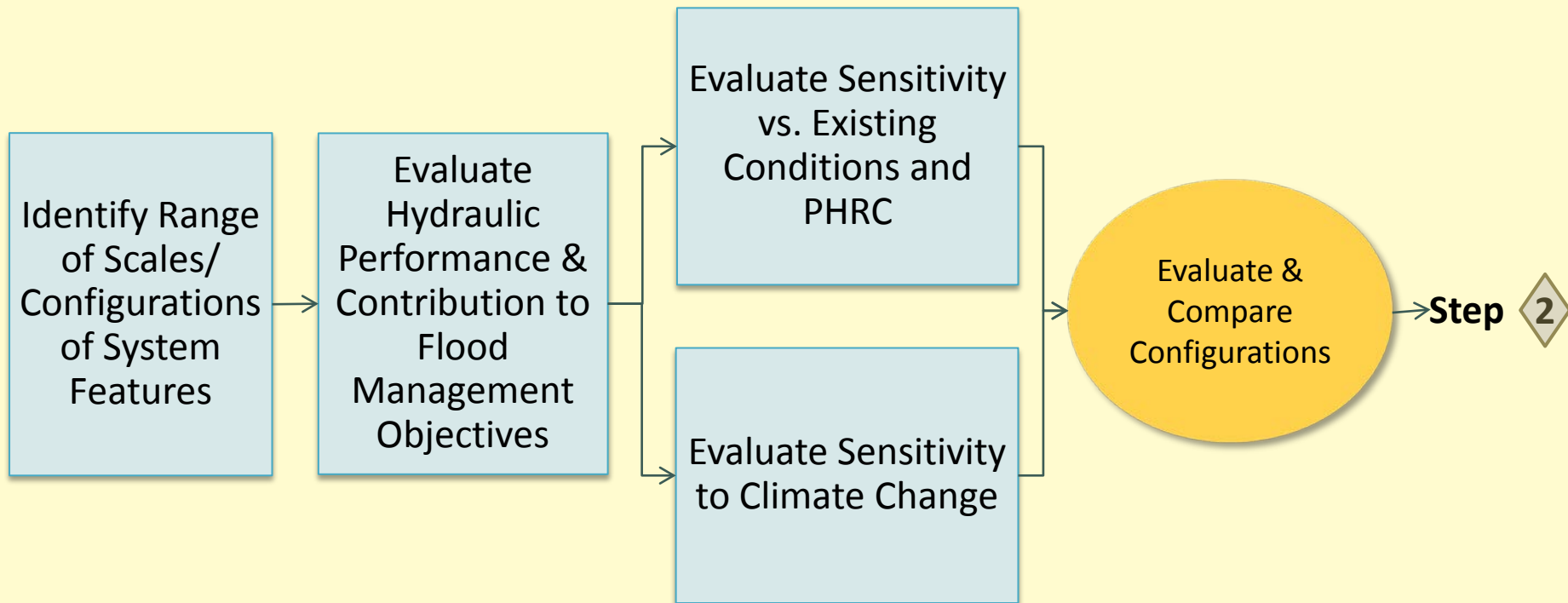
Evaluate Sensitivity vs.
Existing Conditions and
PHRC

Evaluate Sensitivity to
Climate Change

Evaluate &
Compare
Configurations

Step 2

Refinement of SSIA System Elements



Sac Weir/Bypass Sizes/Configurations

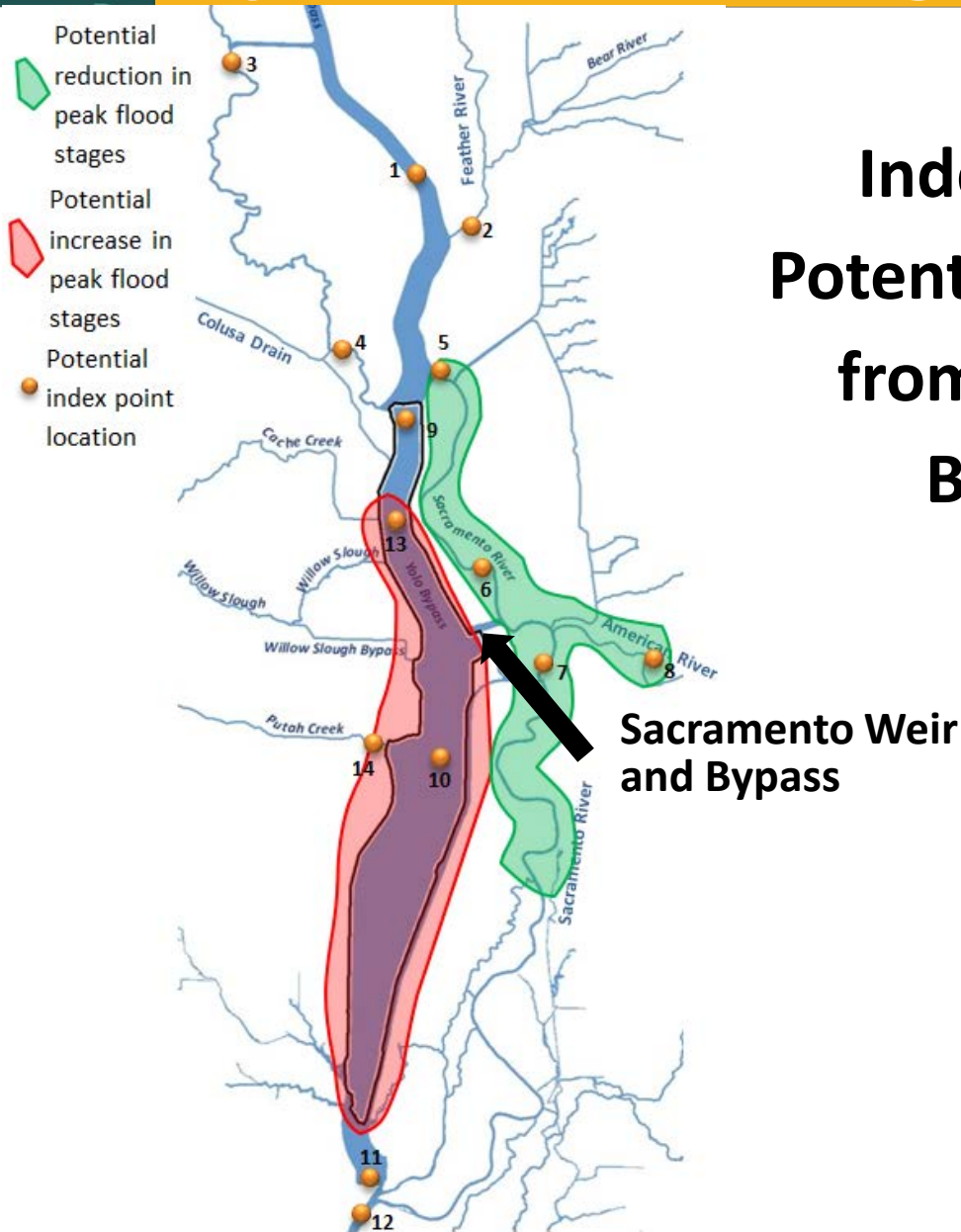


1. Lengthen Weir (16 Gates), Existing Bypass
2. Existing Weir, Widen Bypass 1,000 feet
3. Lengthen Weir (16 Gates), Widen Bypass 500 feet
4. Lengthen Weir (16 Gates), Widen Bypass 1,000 feet
5. Existing Weir, Widen Bypass 2,000 feet
6. Lengthen Weir (16 Gates), Widen Bypass 2,000 feet
7. Lengthen Weir (32 Gates), Widen Bypass 2,000 feet

Evaluation & Comparison Approach

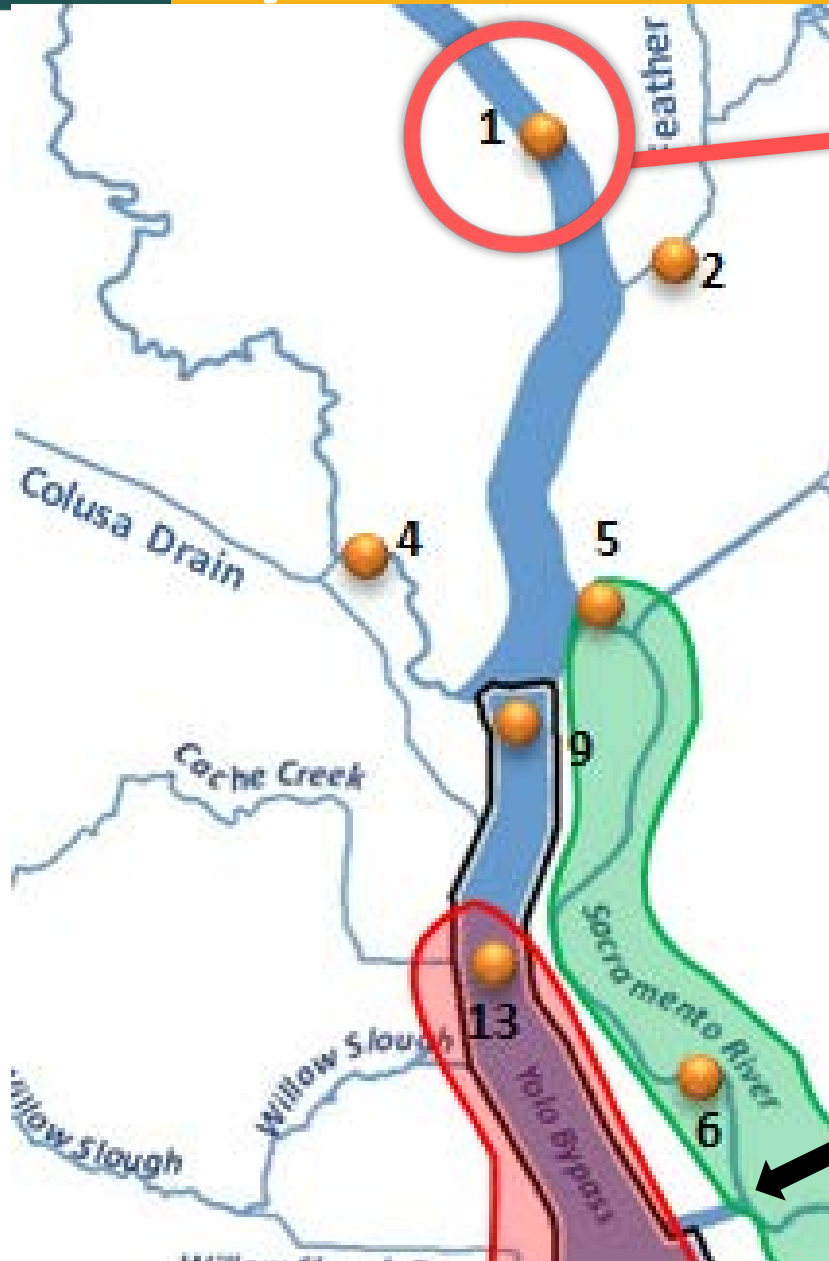
| Criteria | Objective Topic/Matrix | Quantitative | Qualitative |
|---------------|---|--------------|-------------|
| Effectiveness | Urban Protection | ■ | |
| | Rural Risk Reduction | ■ | |
| | System Flexibility <i>(stage/ freeboard, flow)</i> | ■ | |
| | Ecosystem Functions <i>(area for restoration, habitat suitability)</i> | ■ | ■ |
| Efficiency | <u>Partial</u> Analysis <i>(Capital & O&M costs; EAD reduction benefits, life safety benefits)</i> | ■ | |
| Acceptability | Potential Negative Effects <i>(land use, hydraulic, environmental)</i> | | ■ |
| | Regional Support | | ■ |

Hydraulic Modeling Output



**Index Point Locations and
Potential Effect Zones Resulting
from Sacramento Weir and
Bypass Modifications**

Hydraulic Modeling Output: No Change

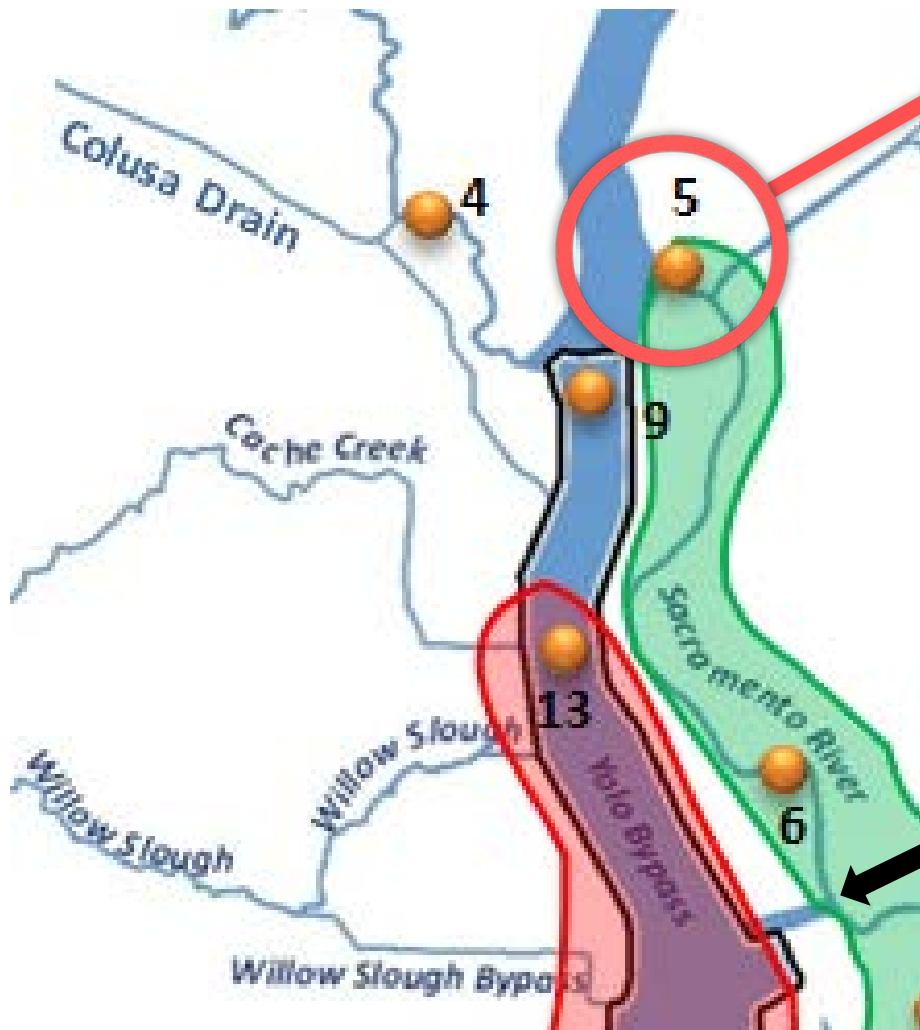


**1. Sutter Bypass
Near Highway 113
(Sutter Causeway)**

*No Changes in Peak Stage for
100-year event under PHRC
Approach*

**Sacramento Weir
and Bypass**

Hydraulic Modeling Output: Small Decrease



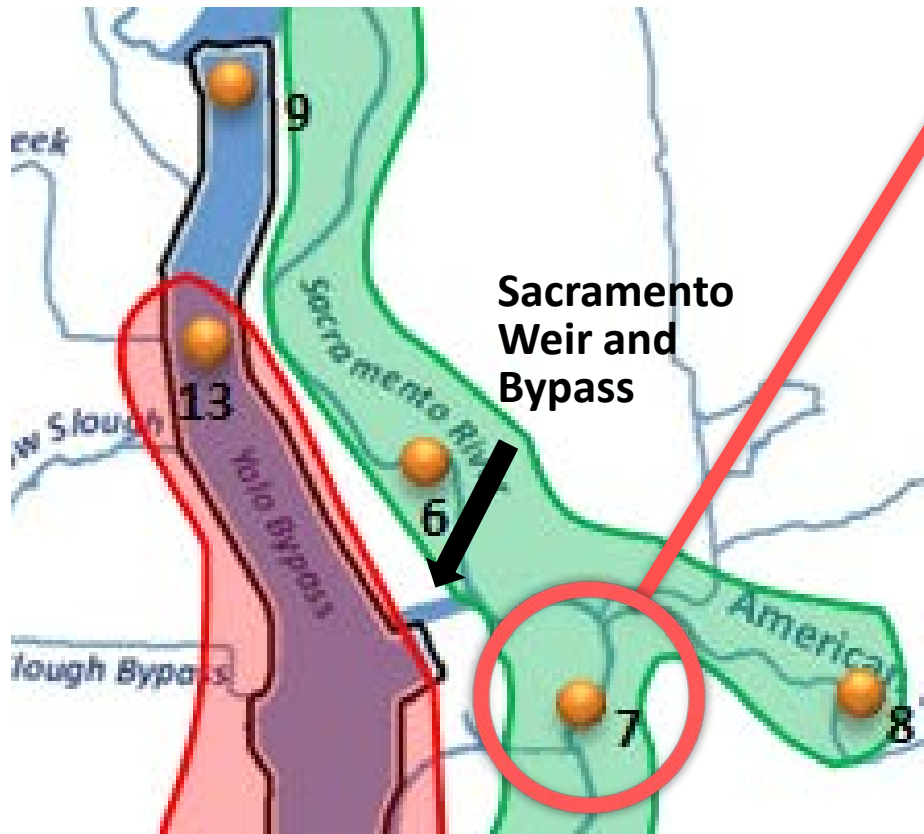
5. Sacramento River at Verona

Changes in Peak Stage for 100-year event under PHRC Approach:

Range from 0.0' to -0.2'

Sacramento Weir and Bypass

Hydraulic Modeling Output: Larger Decrease

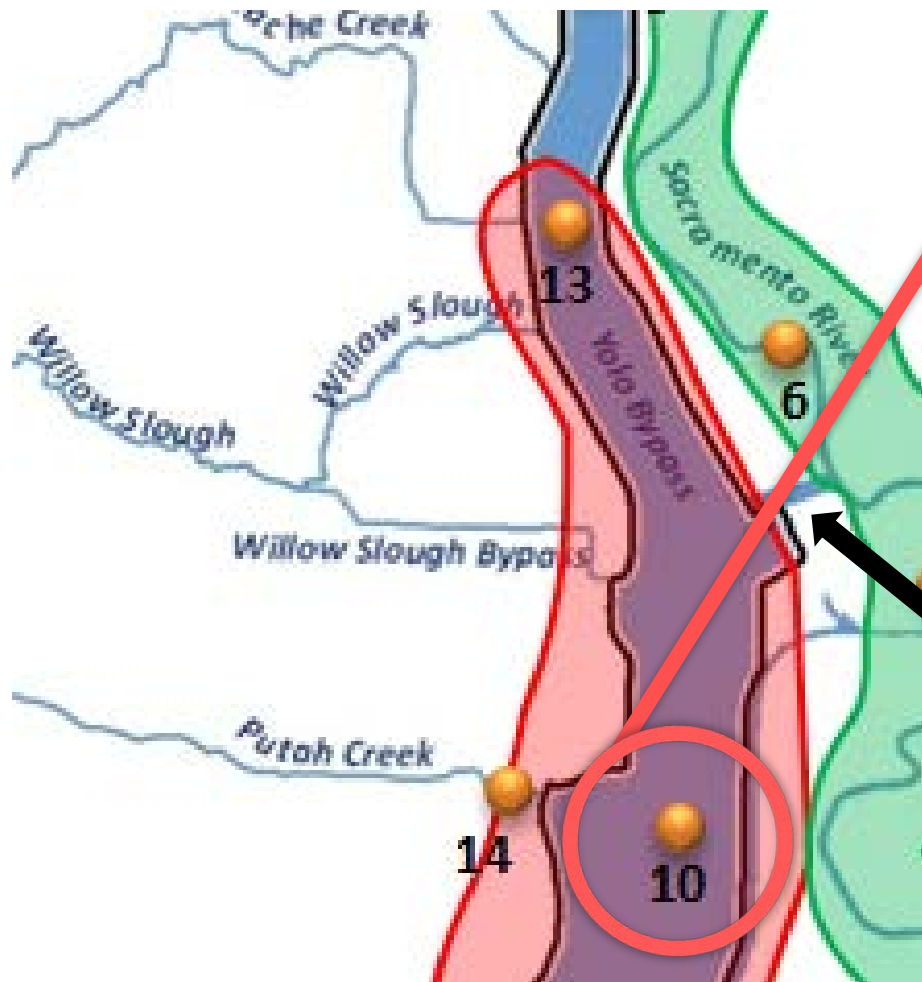


7. Sacramento River at I Street

Changes in Peak Stage for 100-year event under PHRC Approach:

Range from -0.2' to -1.6'

Hydraulic Modeling Output: Small Increase



10. Yolo Bypass at Lisbon

Changes in Peak Stage for 100-year event under PHRC

Approach:

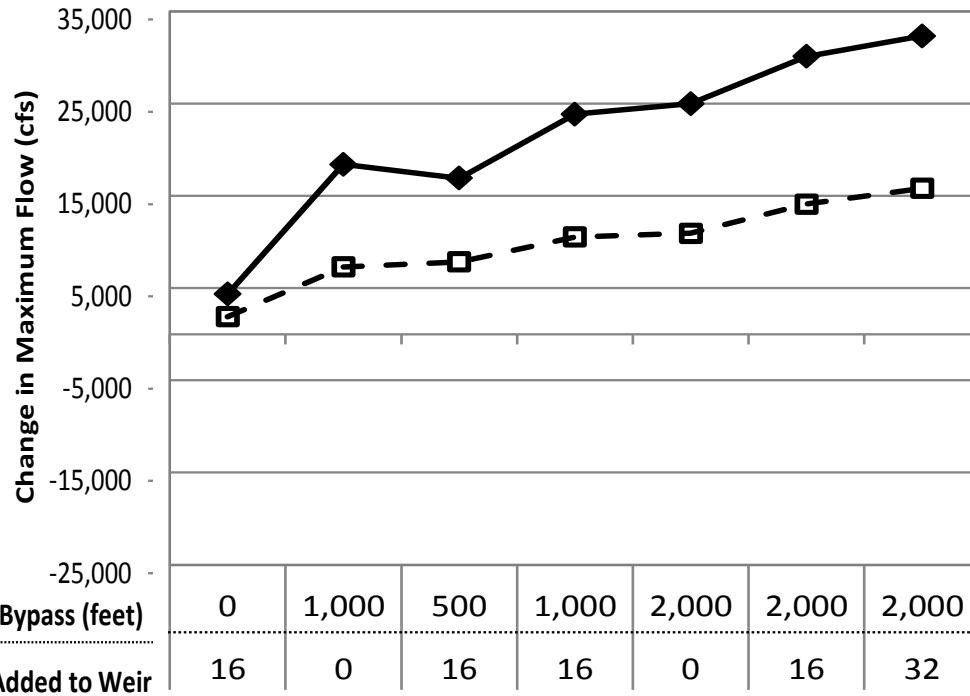
Range from 0.0 to 0.3 feet

Sacramento Weir and Bypass

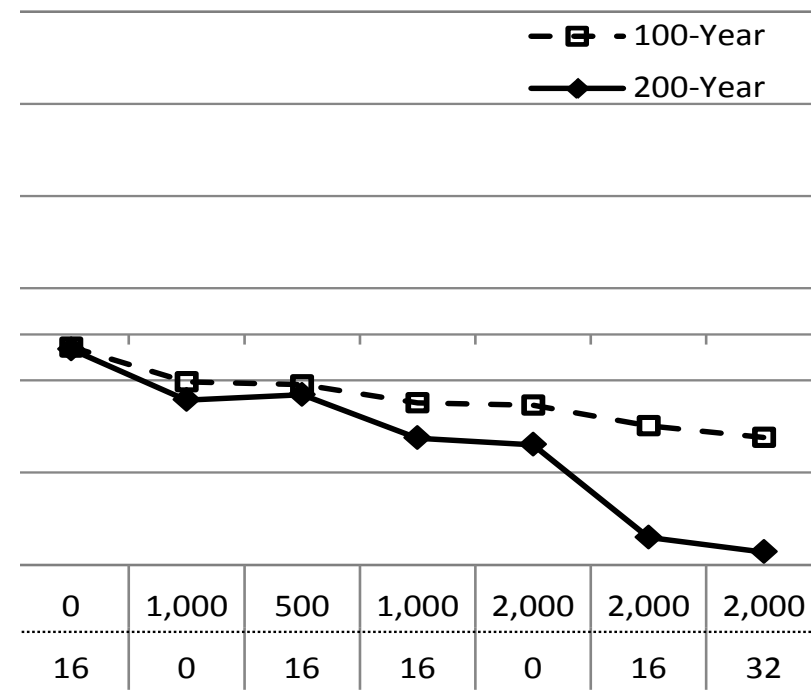
Hydraulic Modeling Output

Changes in Maximum Flows

Flow Over Sacramento Weir

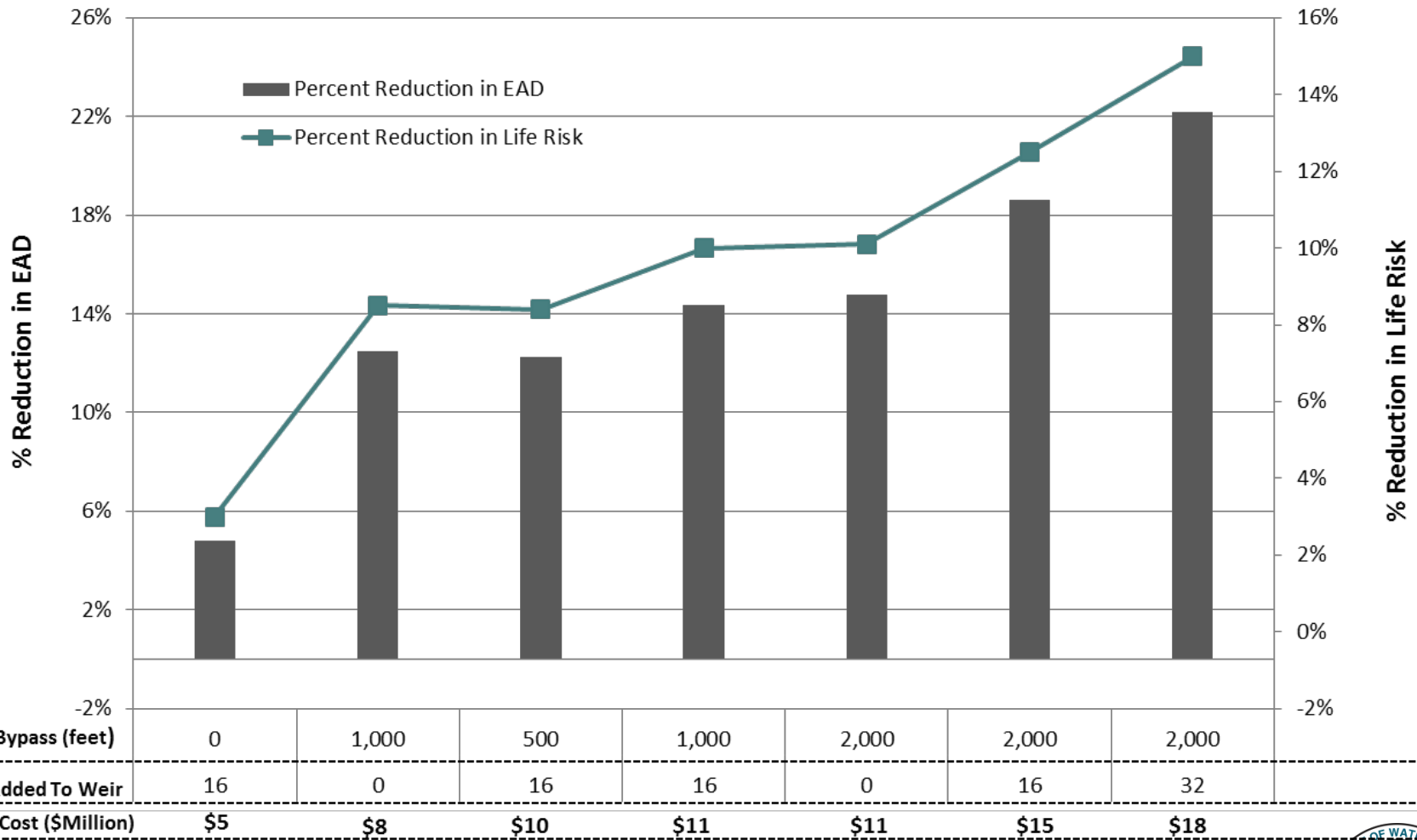


Sacramento River at I Street



Flood Damage Analysis and Life Risk Output

Percent Reduction in Risks to Sacramento Metropolitan Area



Sacramento Weir and Bypass Modifications

Refinement of Sac Weir/Bypass

12% EAD Reduction
9% Life Risk Reduction



Widen 1,000 feet
No gates added

22% EAD Reduction
15% Life Risk Reduction



Widen 2,000 feet
Add 32 gates

Refinement of SSIA System Improvements

BWFS Milestones

M1

M2

M3

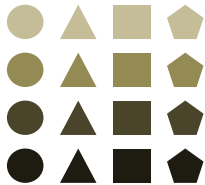
M4, 5, 6

Phase 1

Phase 2

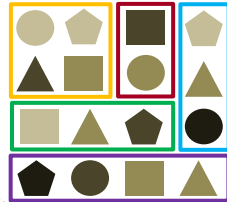
Step 1

Evaluate system improvement features individually



Step 2

Conduct Sensitivity Analysis, Integrate Ecosystem and Regional Features



Step 3

Evaluate trade-offs

Refined System Configurations

Step 4

Confirm recommended basin-wide plan

State Preferred System Configuration

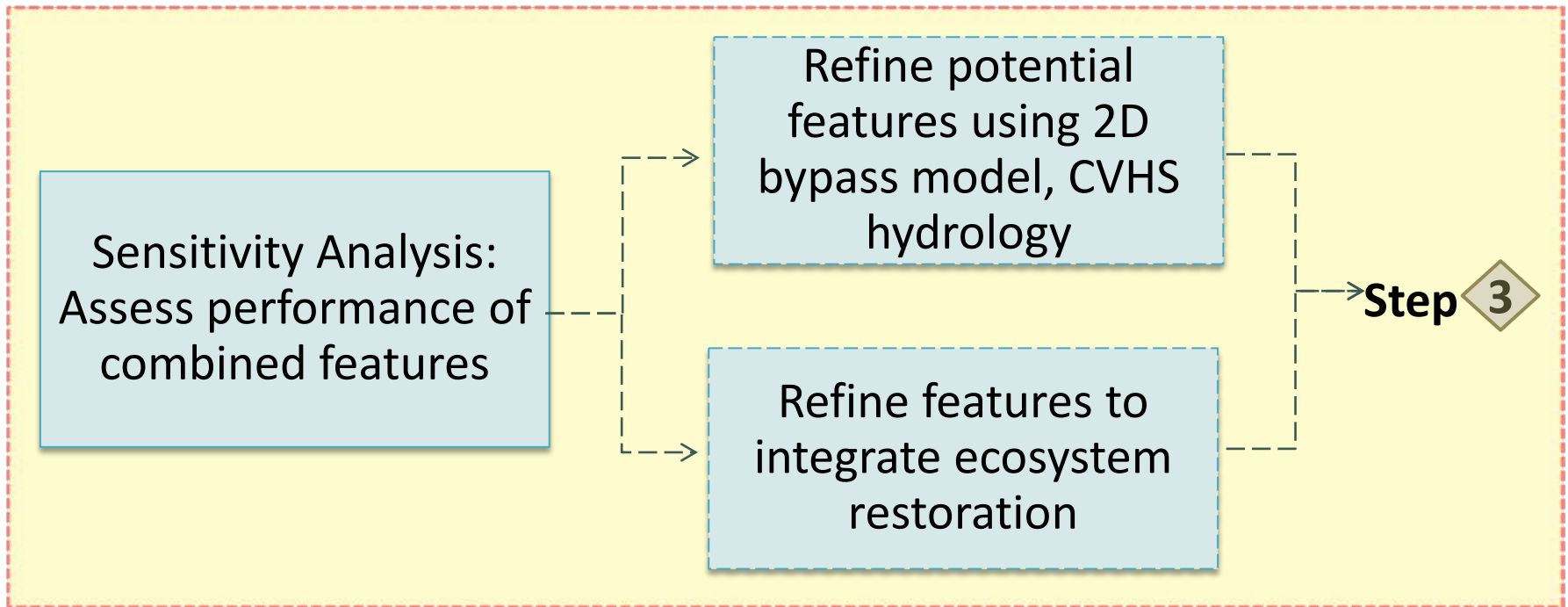
Sensitivity Analysis:
Assess performance of
combined features

Refine potential features
using 2D bypass model,
CVHS hydrology

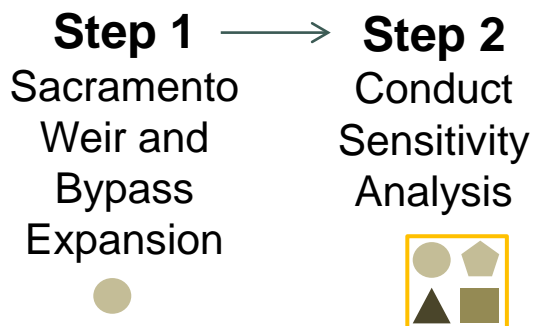
Refine features to
integrate ecosystem
restoration

Step 3

Refinement of SSIA System Improvements



Screening of Various System Configurations



| Fremont Weir | Sacramento Weir and Bypass | Other System Elements | | |
|-------------------|------------------------------------|-----------------------|--|--|
| Lengthen XX mile | Widen 1,000 feet No gates added | | | |
| Lengthen YY miles | Widen 1,000 feet No gates added | | | |
| Lengthen XX mile | Widen 2,000 feet Add 32 gates | | | |
| Lengthen YY miles | Widen 2,000 feet Add 32 gates | | | |

Next Steps: Bypass Element Refinement

Next Steps

- Include reservoir operations features (if available)
- Refine configurations to integrate ecosystem restoration
- Confirm performance using CVHS hydrology and 2D model
- RFMP project integration (confirm assumptions)

Questions?

PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY

Next Steps in Developing BWFS and Conservation Strategy

PUBLIC SAFETY

ENVIRONMENTAL STEWARDSHIP

ECONOMIC STABILITY

Next Steps in BWFS Development

Next Steps

- Refine Problem Identification and Resource Conditions
- Identify Refined System Configurations
- Post-M2 Engagement on Refined System Configurations

Ongoing Development of CS

- Continued Interagency Advisory Committee (IAC) involvement
- Ongoing outreach/coordination with RFMPs
- Programmatic permitting integrated into CS
- CS incorporated into RFMP and BWFS processes

Schedule

Opportunities for Input



PLAN TIMELINES

2013

Q1 | Q2 | Q3 | Q4

2014

Q1 | Q2 | Q3 | Q4

2015-2016

Basin-Wide Feasibility Studies
(Sacramento and San Joaquin Basins)

Milestone 1
Basin Problems, Objectives & System Improvements

Milestone 2
Refined System Configurations

Milestone 3
State Preferred System Configuration

Milestone 4
Public Draft BWFS Report

Milestone 5
Report Revisions

Milestone 6
Final BWFS Report

Central Valley Flood System Conservation Strategy

Objectives and System Improvements

Public Draft Conservation Strategy

Incorporate Conservation Strategy into 2017 CVFPP Update

Regional Flood Management Planning

Problems and Conditions

Preliminary Project List

Draft Finance Plans

Final Regional Plans

